

CITY OF HEYBURN (PWS 5340006) SOURCE WATER ASSESSMENT FINAL REPORT

September 5, 2002



State of Idaho Department of Environmental Quality

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Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This assessment is based on a land use inventory of the designated assessment area, sensitivity factors associated with the wells, and aquifer characteristics.

This report, *Source Water Assessment for the City of Heyburn, Idaho* describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

Final susceptibility scores are derived from equally weighting system construction scores, hydrologic sensitivity scores, and potential contaminant/land use scores. Therefore, a low rating in one or two categories coupled with a higher rating in other categories results in a final rating of low, moderate, or high susceptibility. With the potential contaminants associated with most urban and heavily agricultural areas, the best score a well can get is moderate. Potential contaminants are divided into four categories, inorganic contaminants (IOCs, i.e. nitrates, arsenic), volatile organic contaminants (VOCs, i.e. petroleum products), synthetic organic contaminants (SOCs, i.e. pesticides), and microbial contaminants (i.e. bacteria). As different wells can be subject to various contamination settings, separate scores are given for each type of contaminant.

The City of Heyburn public water system (PWS #5340006) consists of three ground water well sources. All three wells have a moderate susceptibility rating to IOC, VOC, and SOC contamination. Well #1 has a low susceptibility to microbial contamination, while Wells #2 and #3 have a moderate susceptibility rating to microbial contaminants. These ratings are due to a low rating in hydrologic sensitivity, a moderate to low rating for system construction, and a low number of potential contaminant sources.

The IOCs arsenic, barium, nitrite, and fluoride have been detected in water samples at concentrations below maximum contaminant levels (MCLs). In July 1998, Well #3 had an arsenic reading of 20 micrograms per liter ($\mu\text{g/L}$). There was a non-detect (ND) in 2001. In October 2001, the EPA lowered the arsenic MCL from 50 $\mu\text{g/L}$ to 10 $\mu\text{g/L}$. However, public water systems have until 2006 to meet the new requirement. Nitrate levels in the wells have been consistently below 2.4 milligrams per liter (mg/L). The MCL for nitrate is 10 mg/L . No VOCs, SOCs, or microbial contamination have been detected in the wells.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

For the City of Heyburn, drinking water protection activities should first focus on maintaining the requirements of the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system's components and its capacity). Any spills from the potential contaminant sources listed in Tables 1, 2, and 3 of this report should be carefully monitored, as should any future development in the delineated areas. Other practices aimed at reducing the leaching of agricultural chemicals from agricultural land within the designated source water areas should be implemented. Also, disinfection practices should be continued to keep microbial contamination from harming the water. No chemicals should be stored or applied within the 50-foot radius of the wellhead. Most of the designated areas are outside the direct jurisdiction of the City of Heyburn. Partnerships with state and local agencies and industry groups should be established and are critical to success.

Because the arsenic levels in Well #3 have been greater than the level of the revised MCL, the system may need to consider implementing engineering controls to monitor and maintain or reduce the level of this contaminant in the water system. The EPA plans to provide up to \$20 million over the next two years for research and development of more cost-effective technologies to help small systems meet the new MCL (www.epa.gov). EPA has recently (June 2002) released an issue paper (EPA-542-S-02-002) regarding "Proven Alternatives for Aboveground Treatment of Arsenic in Ground water."

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineations are near both urban and residential land use areas. Public education topics could include proper lawn and garden care practices, household hazardous waste disposal methods, proper care and maintenance of septic systems, and the importance of water conservation to name but a few. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. There are transportation corridors near the delineations, therefore the Department of Transportation should be involved in protection activities. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the local Soil Conservation District, and the Natural Resources Conservation Service.

A system must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g. zoning, permitting) or non-regulatory in nature (e.g. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Twin Falls Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR THE CITY OF HEYBURN, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are attached. The list of significant potential contaminant source categories and their rankings, used to develop this assessment, is also attached.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess the over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the wells, and aquifer characteristics. All assessments must be completed by May of 2003. The resources and time available to accomplish assessments are limited. Therefore, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water system is not possible. **This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The ultimate goal of this assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. The Idaho Department of Environmental Quality (DEQ) recognizes that pollution prevention activities generally require less time and money to implement than treating a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a drinking water protection program should be determined by the local community based on its own needs and limitations. Drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The City of Heyburn wells are community wells that serve approximately 2,800 people through approximately 1,000 connections. The public drinking water system for the City of Heyburn is currently comprised of three wells: Well #1 18th & J, Well #2 17th & D, and Well #3. Wells #1 and #2 are located on the eastern side of the City of Heyburn, while Well #3 is located north of the city (Figure 1).

The primary water chemistry issue recorded in the City of Heyburn public water system is arsenic. Arsenic was detected in Well #3 (July 1998) at the level of 20 µg/L. In October 2001, the EPA lowered the arsenic MCL from 50 µg/L to 10 µg/L. However, public water systems have until 2006 to meet the new requirement. Barium, fluoride, nitrite, and nitrate were detected water samples collected from the well manifold at concentrations below the current MCLs. No VOCs, SOCs, or microbial contamination has been detected in the wells. Countywide nitrogen fertilizer use, county level herbicide use, and total county level agricultural chemical use are rated as high for the area. Additionally, the delineation crosses a nitrate priority area and an SOC priority area for the pesticide atrazine.

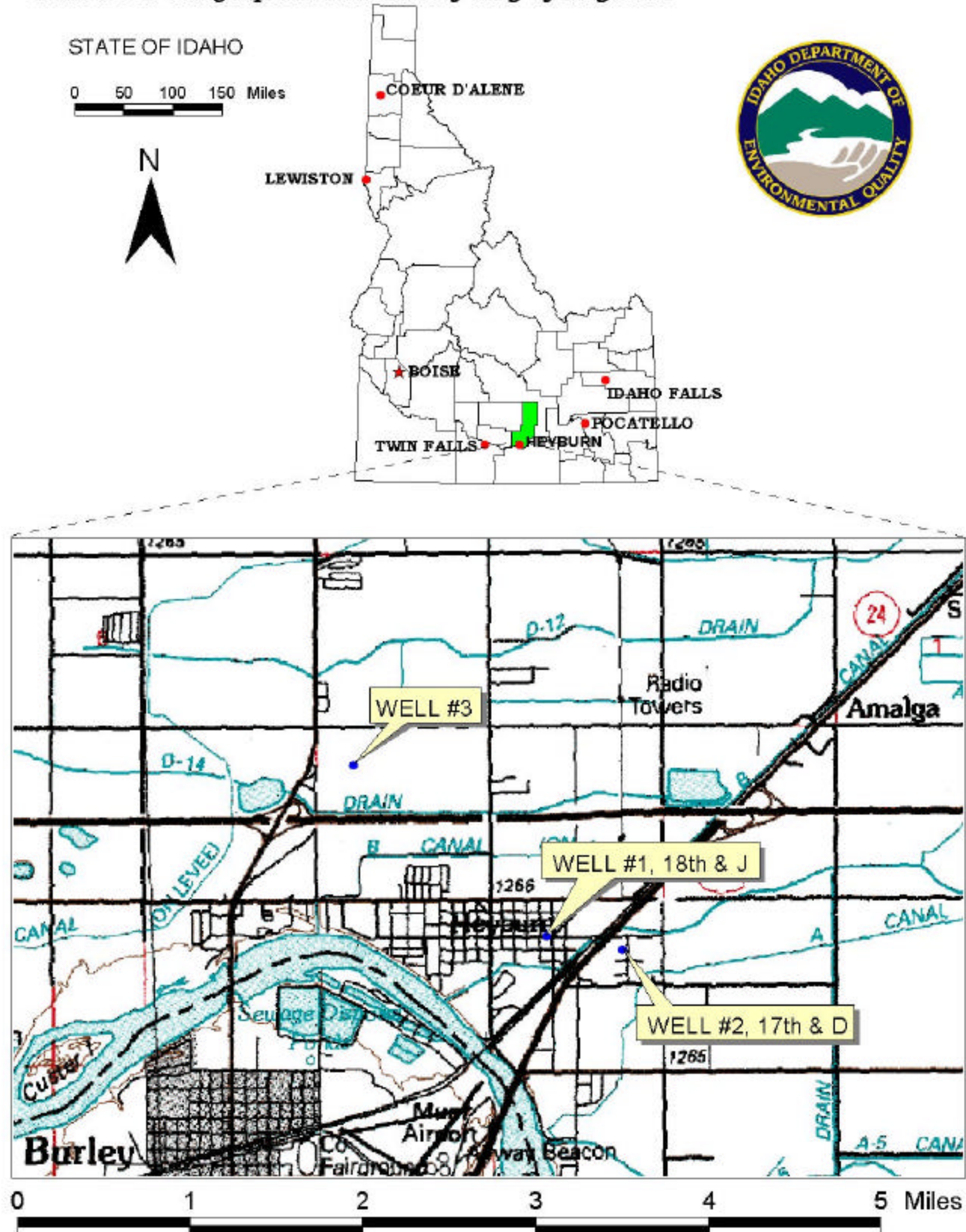
Defining the Zones of Contribution – Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer. Washington Group, International (WGI) used a refined computer model approved by the EPA in determining the time-of-travel (TOT) zones for water associated with the Southwest Eastern Snake River Plain (SW ESRP) aquifer. The computer model used site-specific data, assimilated by DEQ and WGI from a variety of sources including local area well logs and hydrogeologic reports summarized below.

The ESRP is a northeast trending basin located in southeastern Idaho. The 10,000 square miles of the plain are filled primarily with highly fractured layered Quaternary basalt flows of the Snake River Group, which are intercalated with sedimentary rocks along the margins (Garabedian, 1992, p. 5). Individual basalt flows range from 10 to 50 feet thick, averaging 20 to 25 feet thick (Lindholm, 1996, p. 14). Basalt is thickest in the central part of the eastern plain and thins toward the margins. Whitehead (1992, p. 9) estimates the total thickness of the flows to be as great as 5,000 feet. A thin layer (0 to 100 feet) of windblown and fluvial sediments overlies the basalt.

The layered basalts of the Snake River Group host one of the most productive aquifers in the United States. The aquifer is generally considered unconfined, yet may be confined locally because of interbedded clay and dense unfractured basalt (Whitehead, 1992, p. 26). Whitehead (1992, p. 22) reports that well yields of 2,000 to 3,000 gal/min are common for wells open to less than 100 feet of the aquifer. Lindholm (1996, p. 18) estimates aquifer thickness to range from 100 feet near the plain's margin to thousands of feet near the center. Models of the regional aquifer have used values ranging from 200 to 3,000 feet to represent aquifer thickness (Cosgrove et al., 1999, p. 15).

FIGURE 1. Geographic Location of City of Heyburn



Regional ground-water flow is to the southwest paralleling the basin (Cosgrove et al., 1999; deSonneville, 1972, p. 78; Garabedian, 1992, p. 48; and Lindholm, 1996, p. 23). Reported water table gradients range from 3 to 100 ft/mile and average 12 ft/mile (Lindholm, 1996, p. 22). Gradients steepen at the plain's margin and at discharge locations.

The majority of aquifer recharge results from surface water irrigation activities (incidental recharge), which divert water from the Snake River and its tributaries (Ackerman, 1995, p. 4, and Garabedian, 1992, p. 11). Natural recharge occurs through stream losses, direct precipitation, and tributary basin underflow.

The Southwest Margin of the ESRP hydrologic province is the regional aquifer's primary discharge area. Interpretation of well logs indicates that a 1- to 23-foot-thick layer of sediment overlies the fractured basalt aquifer in Jerome County, and that an 8- to 410-foot-thick layer of sediment overlies the same aquifer in southern Minidoka and Power Counties. Published geologic maps of the Snake River Plain (Whitehead 1992, Plates 1 and 5) indicate there is 100 to 500 feet of Quaternary to Tertiary Basalt aged compacted to poorly consolidated sediments located in the Heyburn area (north of the Snake River near Burley). The saturated thickness of the regional basalt aquifer for the Southwest Margin is estimated to range from less than 500 feet near the Snake River to 1,500 feet near Minidoka.

A published water table map of the Kimberly to Bliss region of the aquifer (Moreland, 1976, p. 5) indicates that the ground-water flow direction in the Southwest Margin is similar to that depicted at the regional scale (e.g., Garabedian, 1992, Plate 4).

Annual average precipitation for the period 1951 to 1980 is 9.6 inches in both Twin Falls and Burley (Kjelstrom, 1995, p. 3). The estimated recharge from precipitation in the Southwest Margin ranges from less than 0.5 inch to more than 2 in./yr (Garabedian, 1992, p. 20). Kjelstrom (1995, p. 13) reports an annual river loss of 110,000 acre-feet to the aquifer for the 34.8-mile Minidoka-to-Milner reach of the Snake River. River gains of 210,000 acre-feet for the 21.5-mile Milner-to-Kimberly reach, and 880,000 acre-feet for the 20.4-mile Kimberly-to-Buhl reach are reported for the same period.

The delineated source water assessment areas for the City of Heyburn can best be described as a wedge-shaped corridors extending to the east of the wells and ending four to seven miles from the wellheads at the Snake River (Figures 2, 3, and 4). The actual data used by WGI in determining the source water assessment delineation area is available from DEQ upon request.

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and the City of Heyburn and from available databases.

The dominant land use outside the City of Heyburn area is irrigated agriculture. Land use within the immediate area of the wellheads consists of residential property, commercial and light industrial, and agricultural.

It is important to understand that a release may never occur from a potential source of contamination provided best management practices are used at the facility. Many potential sources of contamination are regulated at the federal level, state level, or both, to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, such as educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

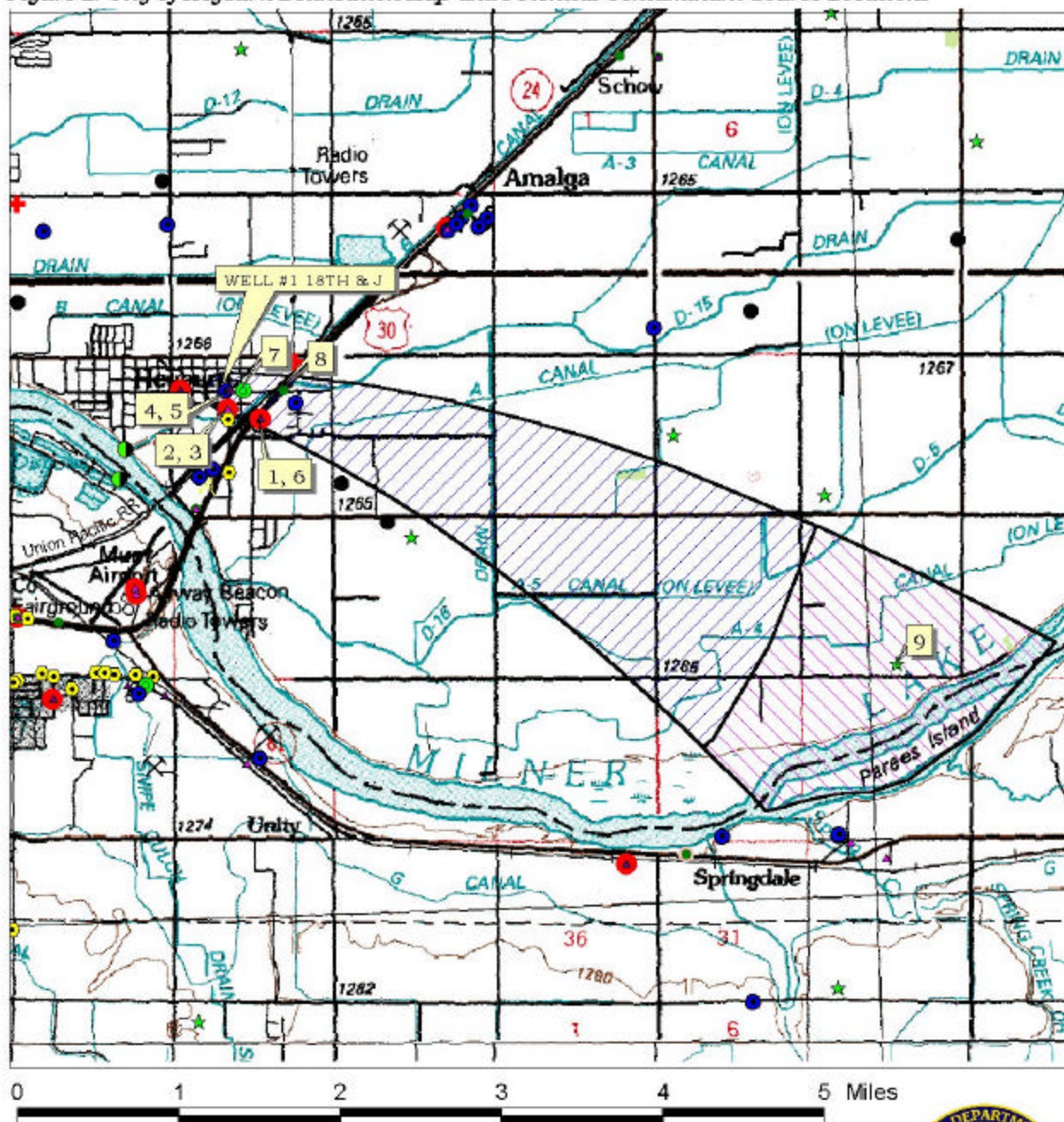
Contaminant Source Inventory Process

A contaminant inventory of the study area was conducted from June to August of 2001. This involved identifying and documenting potential contaminant sources within the City of Heyburn Source Water Assessment Areas through the use of computer databases and Geographic Information System maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved allowing the City of Heyburn Water Treatment Supervisor, Ralph Martini, time to verify DEQs information and provide local knowledge to the process.

Each of the wells have slightly different delineations. The Well #1 18th & J delineation (Table 1, Figure 2) has 10 potential point sources, including leaking underground storage tanks (LUSTs), underground storage tank (UST) sites, a dairy, sites regulated by the Resource Conservation Recovery Act (RCRA) and the Superfund Amendments and Reauthorization Act (SARA), and Highway 24. Well #2 17th & D delineation (Table 2, Figure 3) has three potential point sources including a dairy, a site regulated by SARA, and Highway 24. Well #3 delineation (Table 3, Figure 4) has 14 potential point sources, including a LUST, two UST sites, four dairies, a sand and gravel pit, a gold mine, two Group 1 sites, a SARA site, Highway 24, and the railroad line.

Highway 24 and the railroad are major transportation corridors that cross the delineations in the 3-year TOT. If an accidental spill occurred in any of these sources, IOC, VOCs, SOC, or microbial contaminants could be added to the aquifer system. In addition, the Snake River is considered to be the main source of water for the basalt aquifer in this area. If a spill occurred in the Snake River, there is the potential for all types of contamination to reach the aquifer.

Figure 2. City of Heyburn Delineation Map and Potential Contaminant Source Locations



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PWS# 5340006
WELL #1 18TH & J



Figure 3. City of Heyburn Delineation Map and Potential Contaminant Source Locations

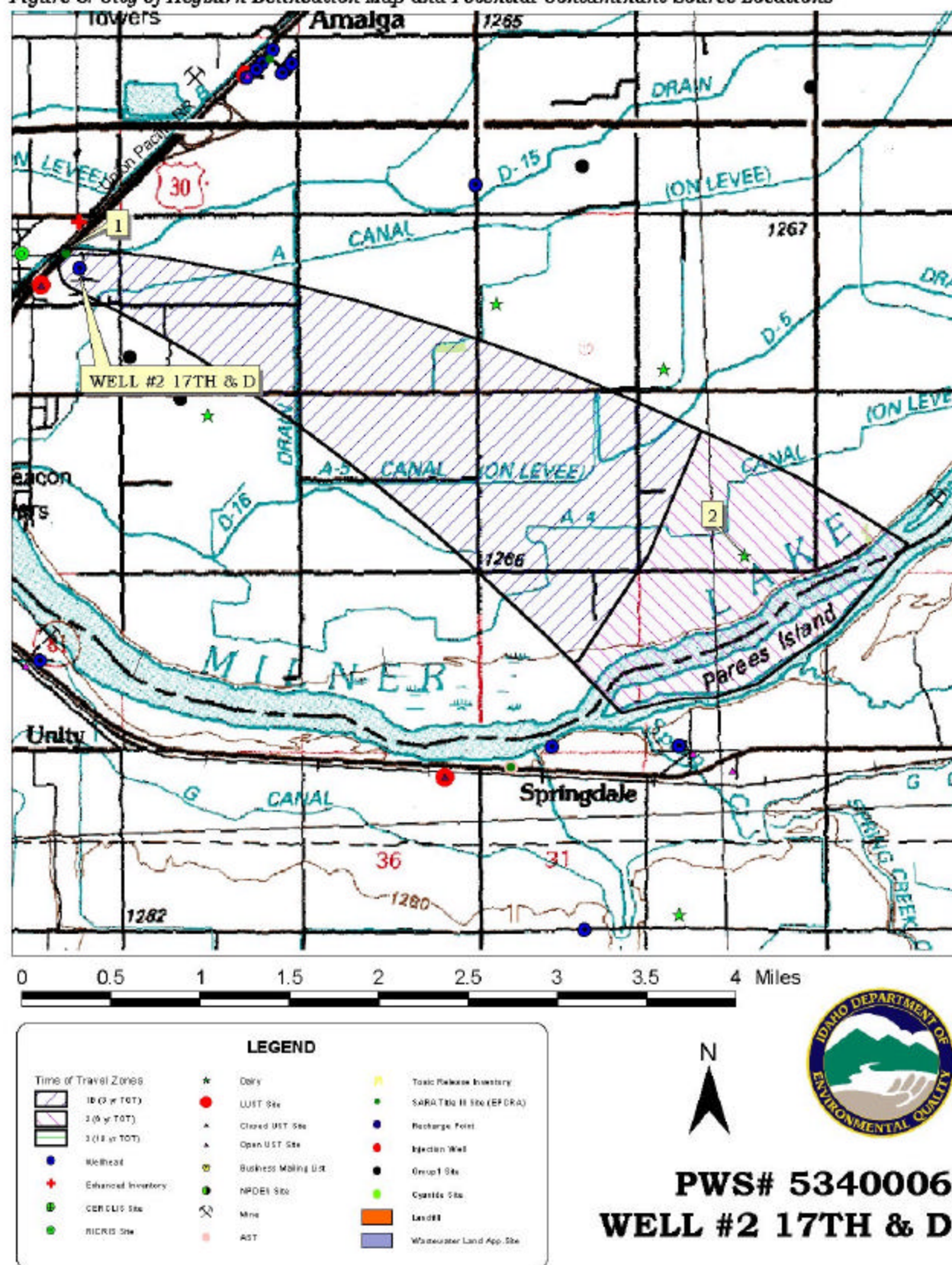
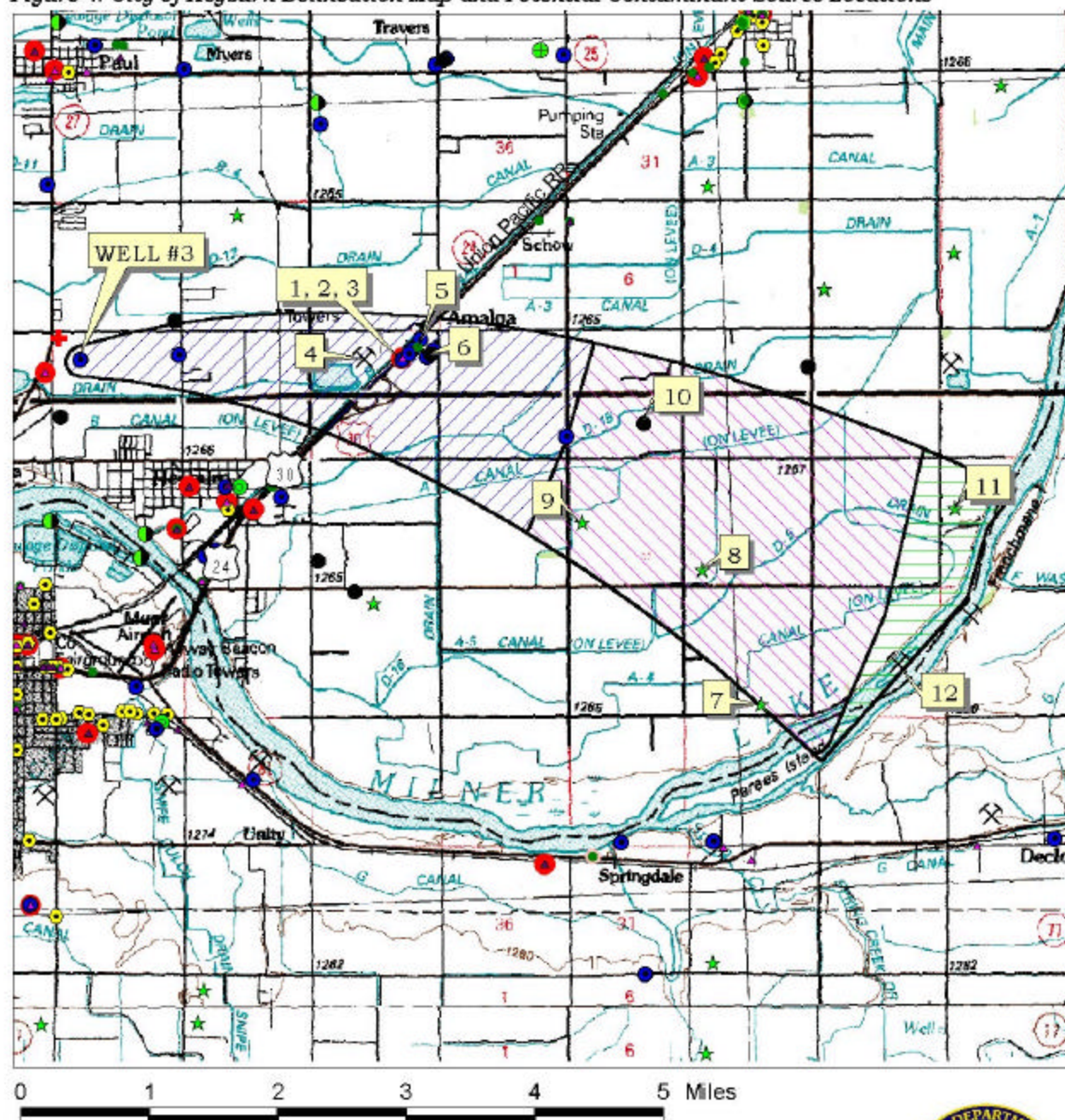


Figure 4. City of Heyburn Delineation Map and Potential Contaminant Source Locations



PWS# 5340006
WELL #3

Table 1. City of Heyburn Well #1 18th & J, Potential Contaminant Inventory

SITE #	Source Description ¹	TOT Zone ² (years)	Source of Information	Potential Contaminants ³
1, 6	LUST: Site Cleanup Completed, Impact: Unknown; UST – Closed	0-3	Database Search	IOC, VOC, SOC
2, 3	LUST: Site Cleanup Incomplete, Impact: Unknown; UST – Open	0-3	Database Search	IOC, VOC, SOC
4	UST – closed	0-3	Database Search	VOC, SOC
5	UST – closed	0-3	Database Search	VOC, SOC
7	RCRA Site	0-3	Database Search	IOC, VOC, SOC
8	SARA Site	0-3	Database Search	IOC, VOC, SOC
9	Dairy ≤ 200 cows	3-6	Database Search	IOC
	Highway 24	0-3	GIS Map	IOC, VOC, SOC, Microbial
	Snake River	3-10	GIS Map	IOC, VOC, SOC, Microbial

¹ LUST = leaking underground storage tank, UST = underground storage tank, RCRA = Resource Conservation Recovery Act, SARA = Superfund Amendments and Reauthorization Act

² TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead

³ IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Table 2. City of Heyburn Well #2 17th & D, Potential Contaminant Inventory

SITE #	Source Description ¹	TOT Zone ² (years)	Source of Information	Potential Contaminants ³
1	SARA Site	0-3	Database Search	IOC, VOC, SOC
2	Dairy ≤ 200 cows	3-6	Database Search	IOC
	Highway 24	0-3	GIS Map	IOC, VOC, SOC, Microbial
	Snake River	3-10	GIS Map	IOC, VOC, SOC, Microbial

¹ SARA = Superfund Amendments and Reauthorization Act

² TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead

³ IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Table 3. City of Heyburn Well #3, Potential Contaminant Inventory

SITE #	Source Description ¹	TOT Zone ² (years)	Source of Information	Potential Contaminants ³
1, 2, 3	LUST: Site Cleanup Completed, Impact: Unknown; UST – Closed; UST – Open	0-3	Database Search	VOC, SOC
4	Sand and gravel pit	0-3	Database Search	IOC
5	SARA Site	0-3	Database Search	VOC, SOC
6	Group 1 Site – Atrazine	0-3	Database Search	SOC
	Highway 24	0-3	GIS Map	IOC, VOC, SOC, Microbial
	Railroad Line	0-3	GIS Map	IOC, VOC, SOC, Microbial
7	Dairy ≤ 200 cows	3-6	Database Search	IOC
8	Dairy ≤ 200 cows	3-6	Database Search	IOC
9	Dairy ≤ 200 cows	3-6	Database Search	IOC
10	Group 1 – Nitrate	3-6	Database Search	IOC
11	Dairy ≤ 200 cows	6-10	Database Search	IOC
12	Gold Mine	6-10	Database Search	IOC
	Snake River	6-10	Database Search	IOC, VOC, SOC

¹ UST = underground storage tank, WLAP = wastewater land application site

² TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead

³ IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Section 3. Susceptibility Analyses

Each well's susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Attachment A contains the susceptibility analysis worksheets. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors: the surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone above the producing zone of the well. Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet protect the ground water from contamination.

The hydrologic sensitivity was low for the wells (see Table 5). This reflects the poor to moderately drained nature of the soil, a vadose zone made of clay, and greater than 50 feet of low permeability zones between the surface and the producing layers.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system is less vulnerable to contamination. For example, if the well casing and annular seal both extend into a low permeability unit, then the possibility of contamination is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capacity. If the wellhead and surface seal are maintained to standards, as outlined in Sanitary Surveys, then contamination down the well bore is less likely. If the well is protected from surface flooding and is outside the 100-year floodplain, then contamination from surface events is reduced.

The City of Heyburn drinking water system consists of three wells that extract ground water for community uses. Wells #1 rated low susceptibility for system construction. Wells #2 and #3 rated moderate susceptibility for system construction. The 1999 Sanitary Survey found that the wellheads and surface seals were maintained and protected from surface flooding. Additional information was contained in the well logs (Table 4).

Table 4. City of Heyburn Well Construction Summary Information

Well	Well Depth (ft)	Water Table Depth (ft)	Casing: diameter/ thickness (in)	Casing: depth (ft)/ formation	Surface seal: depth (ft)/ formation	Screened Interval (ft)	Drill Year	Sanitary Survey Elements (A/B) ¹
Well #1	450	227	20, 16/0.375	319/Black lava	317/Black lava	340-440	1996	Yes/Yes
Well #2	445	213	20, 16/0.375	330/Black lava	18/Sand and gravel	337-445 open hole	1979	Yes/Yes
Well #3	451	240	20, 16/0.375	352/Hard black lava	350/Wet black cinders	352-451 open hole	1996	Yes/Yes

¹ A = Well and surface seal in compliance; B = Protected from surface flooding

NI = no information was available

Well #1 18th & J, installed in 1996, consists of 0.375-inch thick, 20- and 16-inch casing set to 319 feet below ground surface (bgs) into black lava. The surface seal was installed to 317 feet bgs into black lava. The static water level was at 227 feet bgs. With the correct casing thickness, substantial pumping test, and sealing and screen installation from 340 feet bgs to 440 feet bgs, Well #1 meets current well construction standards.

Well #2 17th & D, installed in 1979, consists of a combination of 0.250-inch thick and 0.375-inch thick, 24-, 20-, 18-, 16-, and 14-inch casing set to 337 feet bgs into black lava. The surface seal was installed to 18 feet bgs into sand and gravel, but bentonite was installed between the casing to a deeper depth. The static water level was at 213 feet bgs. Though Well #2 17th & D may have met well construction standards at the time of installation, current well construction standards are stricter.

Well #3, installed in 1996, consists of 0.375-inch thick, 20- and 16-inch casing set to 352 feet bgs into hard black lava. The surface seal was installed to 350 feet bgs into wet black cinders. The static water level was at 240 feet bgs. No screen was put in place. With the correct casing thickness, substantial pumping test, and sealing and screening installation, Well #3 meets current well construction standards.

The Idaho Department of Water Resources *Well Construction Standards Rules* (1993) require all Public Water Systems (PWSs) to follow DEQ standards as well. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works* (1997) during construction. Some of the requirements include casing thickness, well tests, and depth and formation type that the surface seal must be installed into. Table 1 of the *Recommended Standards for Water Works* (1997) lists the required steel casing thickness for various diameter wells. Twelve-inch or greater diameter wells require a casing thickness of at least 0.375-inches. Well tests are required at the design pumping rate for 24 hours or until stabilized drawdown has continued for at least six hours when pumping at 1.5 times the design pumping rate. Casing is required to be sealed to a minimum of 18 feet bgs if there is a low permeability layer at that depth. Otherwise, surface seals must be extended into low permeability or consolidated zones. Only Well #2 received an additional point in the system construction category.

Potential Contaminant Source and Land Use

Well #1 18th & J rated high for IOCs (e.g. arsenic, nitrate), VOCs (e.g. petroleum products), and SOCs (e.g. pesticides), and low for microbial contaminants (e.g. bacteria). Well #2 17th & D rated high for IOCs and SOCs, moderate for VOCs, and low for microbial contaminants. Well #3 rated high for IOCs, VOCs, and SOCs, and moderate for microbial contaminants. The transportation corridors and agricultural land uses affect each of the wells equally. The difference between the ratings is because of the different numbers of potential contaminant sources (Tables 1, 2, and 3). County level nitrogen fertilizer use, county level herbicide use, and total county level agricultural chemical use are rated as high for both wells. The delineations also cross a nitrate priority area and an SOC priority area for the pesticide atrazine.

Final Susceptibility Rating

An IOC detection above a drinking water standard MCL, any detection of a VOC or SOC, or a detection of total coliform bacteria or fecal coliform bacteria at the wellhead will automatically give a high susceptibility rating to a well, despite the land use of the area, because a pathway for contamination already exists. Additionally, the storage or application of any potential contaminants within 50 feet of the wellhead will lead to an automatic high score. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0- to 3-year time-of-travel zone (Zone 1B) and much agricultural land contribute greatly to the overall ranking. In terms of total susceptibility, all the wells rate moderate in all categories, except for Well #1 18th & J, which rates low for microbial contamination.

Table 5. Summary of the City of Heyburn Susceptibility Evaluation

Source	Susceptibility Scores ¹									
	Hydrologic Sensitivity	Contaminant Inventory				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well #1	L	H	H	H	L	L	M	M	M	L
Well #2	L	H	M	H	L	M	M	M	M	M
Well #3	L	H	H	H	M	M	M	M	M	M

¹H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility

IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Susceptibility Summary

In terms of total susceptibility, the wells rate moderate in all categories, except for Well #1 18th & J, which rates low for microbial contamination. The low hydrologic sensitivity and low to moderate system construction scores influenced the overall scores the most.

The primary water chemistry issue recorded in the City of Heyburn public water system is arsenic. Arsenic was detected in Well #3 (July 1998) at the level of 20 µg/L. In October 2001, the EPA lowered the arsenic MCL from 50 µg/L to 10 µg/L. However, public water systems have until 2006 to meet the new requirement. Barium, fluoride, nitrite, and nitrate were detected water samples collected from the well manifold at concentrations below the current MCLs. No VOCs, SOC, or microbial contamination has been detected in the wells. Countywide nitrogen fertilizer use, county level herbicide use, and total county level agricultural chemical use are rated as high for the area. Additionally, the delineation crosses a nitrate priority area and an SOC priority area for the pesticide atrazine.

Section 4. Options for Drinking Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective drinking water protection program is tailored to the particular local drinking water protection area. For the City of Heyburn, drinking water protection activities should first focus on maintaining the requirements of the sanitary survey. Any spills from the potential contaminant sources listed in Table 1, 2, and 3 of this report should be carefully monitored, as should any future development in the delineated areas. Other practices aimed at reducing the leaching of agricultural chemicals from agricultural land within the designated source water areas should be implemented. Also, disinfection practices should be continued to keep microbial contamination from harming the water. No chemicals should be stored or applied within the 50-foot radius of the wellhead.

Most of the designated areas are outside the direct jurisdiction of the City of Heyburn. Partnerships with state and local agencies and industry groups should be established and are critical to success.

Because the arsenic levels in Well #3 have been greater than the level of the revised MCL, the system may need to consider implementing engineering controls to monitor and maintain or reduce the level of this contaminant in the water system. The EPA plans to provide up to \$20 million over the next two years for research and development of more cost-effective technologies to help small systems meet the new MCL (www.epa.gov). EPA has recently (June 2002) released an issue paper (EPA-542-S-02-002) regarding "Proven Alternatives for Aboveground Treatment of Arsenic in Ground water."

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineations are near both urban and residential land use areas. Public education topics could include proper lawn and garden care practices, household hazardous waste disposal methods, proper care and maintenance of septic systems, and the importance of water conservation to name but a few. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. There are transportation corridors near the delineations, therefore the Department of Transportation should be involved in protection activities. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the local Soil Conservation District, and the Natural Resources Conservation Service.

A system must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Twin Falls Regional Office of the DEQ or the Idaho Rural Water Association.

Assistance

Public water suppliers and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Twin Falls Regional DEQ Office (208) 736-2190

State DEQ Office (208) 373-0502

Website: <http://www.deq.state.id.us>

Water suppliers serving fewer than 10,000 persons may contact Ms. Melinda Harper, Idaho Rural Water Association, at 1-208-343-7001 or mlharper@idahoruralwater.com for assistance with drinking water protection (formerly wellhead protection) strategies.

POTENTIAL CONTAMINANT INVENTORY

LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as Superfund, is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100-year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.

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Attachment A

City of Heyburn
Susceptibility Analysis
Worksheets

The final scores for the susceptibility analysis were determined using the following formulas:

- 1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)
- 2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.35)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

Ground Water Susceptibility Report

Public Water System Name :

HEYBURN CITY OF

Well# : WELL #1 18TH &J

Public Water System Number 5340006

10/18/2001 1:24:02 PM

1. System Construction

SCORE

Drill Date	06/10/1996	
Driller Log Available	YES	
Sanitary Survey (if yes, indicate date of last survey)	YES	1999
Well meets IDWR construction standards	YES	0
Wellhead and surface seal maintained	YES	0
Casing and annular seal extend to low permeability unit	YES	0
Highest production 100 feet below static water level	YES	0
Well located outside the 100 year flood plain	YES	0

Total System Construction Score 0

2. Hydrologic Sensitivity

Soils are poorly to moderately drained	YES	0
Vadose zone composed of gravel, fractured rock or unknown	NO	0
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	YES	0

Total Hydrologic Score 1

3. Potential Contaminant / Land Use - ZONE 1A

IOC
ScoreVOC
ScoreSOC
ScoreMicrobial
Score

Land Use Zone 1A	IRRIGATED CROPLAND	2	2	2	2
Farm chemical use high	YES	2	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		4	2	4	2

Potential Contaminant / Land Use - ZONE 1B

Contaminant sources present (Number of Sources)	YES	5	7	7	1
(Score = # Sources X 2) 8 Points Maximum		8	8	8	2
Sources of Class II or III leacheable contaminants or	YES	5	5	2	
4 Points Maximum		4	4	2	
Zone 1B contains or intercepts a Group 1 Area	YES	2	0	2	0
Land use Zone 1B Greater Than 50% Irrigated Agricultural Land		4	4	4	4

Total Potential Contaminant Source / Land Use Score - Zone 1B 18 16 16 6

Potential Contaminant / Land Use - ZONE II

Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II Greater Than 50% Irrigated Agricultural Land		2	2	2	

Potential Contaminant Source / Land Use Score - Zone II 5 5 5 0

Potential Contaminant / Land Use - ZONE III

Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0	

Total Potential Contaminant Source / Land Use Score - Zone III 2 2 2 0

Cumulative Potential Contaminant / Land Use Score 29 25 27 8

4. Final Susceptibility Source Score

7 6 6 4

5. Final Well Ranking

Moderate Moderate Moderate Low

1. System Construction		SCORE			
Drill Date	11/22/1979				
Driller Log Available	YES				
Sanitary Survey (if yes, indicate date of last survey)	YES	1999			
Well meets IDWR construction standards	NO	1			
Wellhead and surface seal maintained	YES	0			
Casing and annular seal extend to low permeability unit	NO	2			
Highest production 100 feet below static water level	YES	0			
Well located outside the 100 year flood plain	NO	1			
Total System Construction Score		4			
2. Hydrologic Sensitivity					
Soils are poorly to moderately drained	YES	0			
Vadose zone composed of gravel, fractured rock or unknown	NO	0			
Depth to first water > 300 feet	NO	1			
Aquitard present with > 50 feet cumulative thickness	YES	0			
Total Hydrologic Score		1			
3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED CROPLAND	2	2	2	2
Farm chemical use high	YES	2	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		4	2	4	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	2	2	2	1
(Score = # Sources X 2) 8 Points Maximum		4	4	4	2
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
4 Points Maximum		1	1	1	
Zone 1B contains or intercepts a Group 1 Area	YES	2	0	2	0
Land use Zone 1B Greater Than 50% Irrigated Agricultural Land		4	4	4	4
Total Potential Contaminant Source / Land Use Score - Zone 1B		11	9	11	6
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II Greater Than 50% Irrigated Agricultural Land		2	2	2	
Potential Contaminant Source / Land Use Score - Zone II		5	5	5	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III		2	2	2	0
Cumulative Potential Contaminant / Land Use Score		22	18	22	8
4. Final Susceptibility Source Score		9	9	9	8
5. Final Well Ranking		Moderate	Moderate	Moderate	Moderate

1. System Construction		SCORE			
Drill Date	05/17/1996				
Driller Log Available	YES				
Sanitary Survey (if yes, indicate date of last survey)	YES	1999			
Well meets IDWR construction standards	YES	0			
Wellhead and surface seal maintained	YES	0			
Casing and annular seal extend to low permeability unit	NO	2			
Highest production 100 feet below static water level	YES	0			
Well located outside the 100 year flood plain	YES	0			
Total System Construction Score		2			
2. Hydrologic Sensitivity					
Soils are poorly to moderately drained	YES	0			
Vadose zone composed of gravel, fractured rock or unknown	NO	0			
Depth to first water > 300 feet	NO	1			
Aquitard present with > 50 feet cumulative thickness	YES	0			
Total Hydrologic Score		1			
3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED CROPLAND	2	2	2	2
Farm chemical use high	YES	2	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		4	2	4	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	3	4	5	2
(Score = # Sources X 2) 8 Points Maximum		6	8	8	4
Sources of Class II or III leacheable contaminants or	YES	6	4	3	
4 Points Maximum		4	4	3	
Zone 1B contains or intercepts a Group 1 Area	YES	2	0	2	0
Land use Zone 1B Greater Than 50% Irrigated Agricultural Land		4	4	4	4
Total Potential Contaminant Source / Land Use Score - Zone 1B		16	16	17	8
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	0	0	
Sources of Class II or III leacheable contaminants or	YES	1	0	0	
Land Use Zone II Greater Than 50% Irrigated Agricultural Land		2	2	2	
Potential Contaminant Source / Land Use Score - Zone II		5	2	2	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	YES	1	1	1	
Total Potential Contaminant Source / Land Use Score - Zone III		3	3	3	0
Cumulative Potential Contaminant / Land Use Score		28	23	26	10
4. Final Susceptibility Source Score		9	8	8	7
5. Final Well Ranking		Moderate	Moderate	Moderate	Moderate